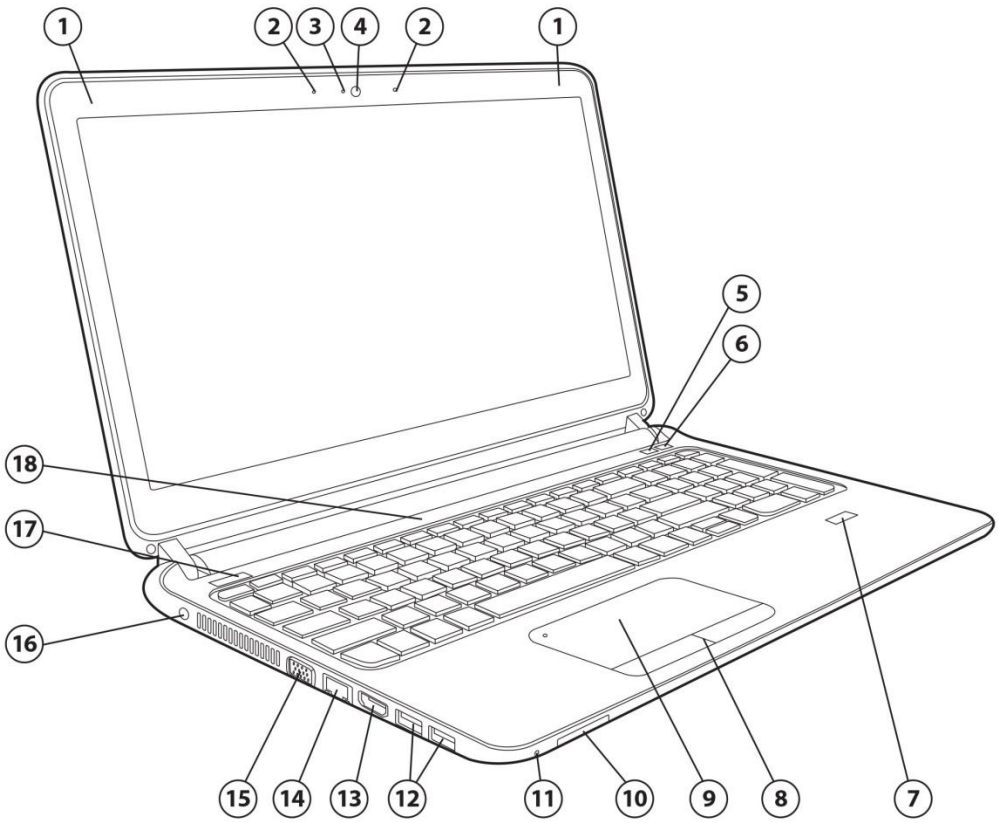
Overview

HP ProBook 455 G2 Notebook PC



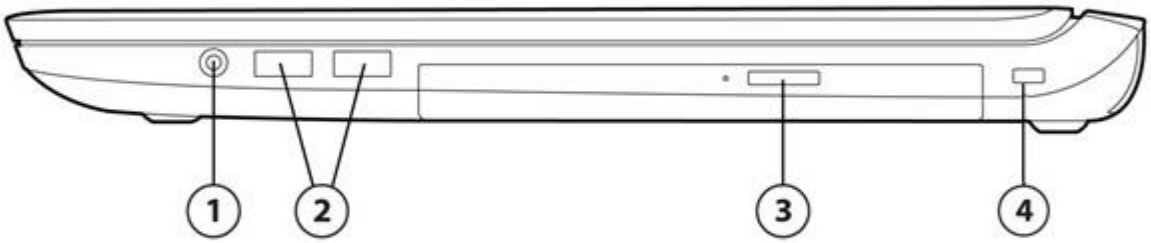
Front

1. WLAN antennas*
2. Dual-microphone array**
3. Webcam light**
4. Optional Webcam
5. Wireless on/off button
6. Speaker mute button
7. Optional Fingerprint Reader
8. Touchpad pick buttons
9. Touchpad
10. Media Card Reader
11. Hard drive activity LED indicator
12. USB 3.0 ports (2)
13. HDMI port
14. RJ-45 (network) jack
    RJ-45 (network) lights (2)
15. VGA monitor port
16. Power connector
17. Power button
18. Speakers (2)

* The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

** Only available with optional webcam.

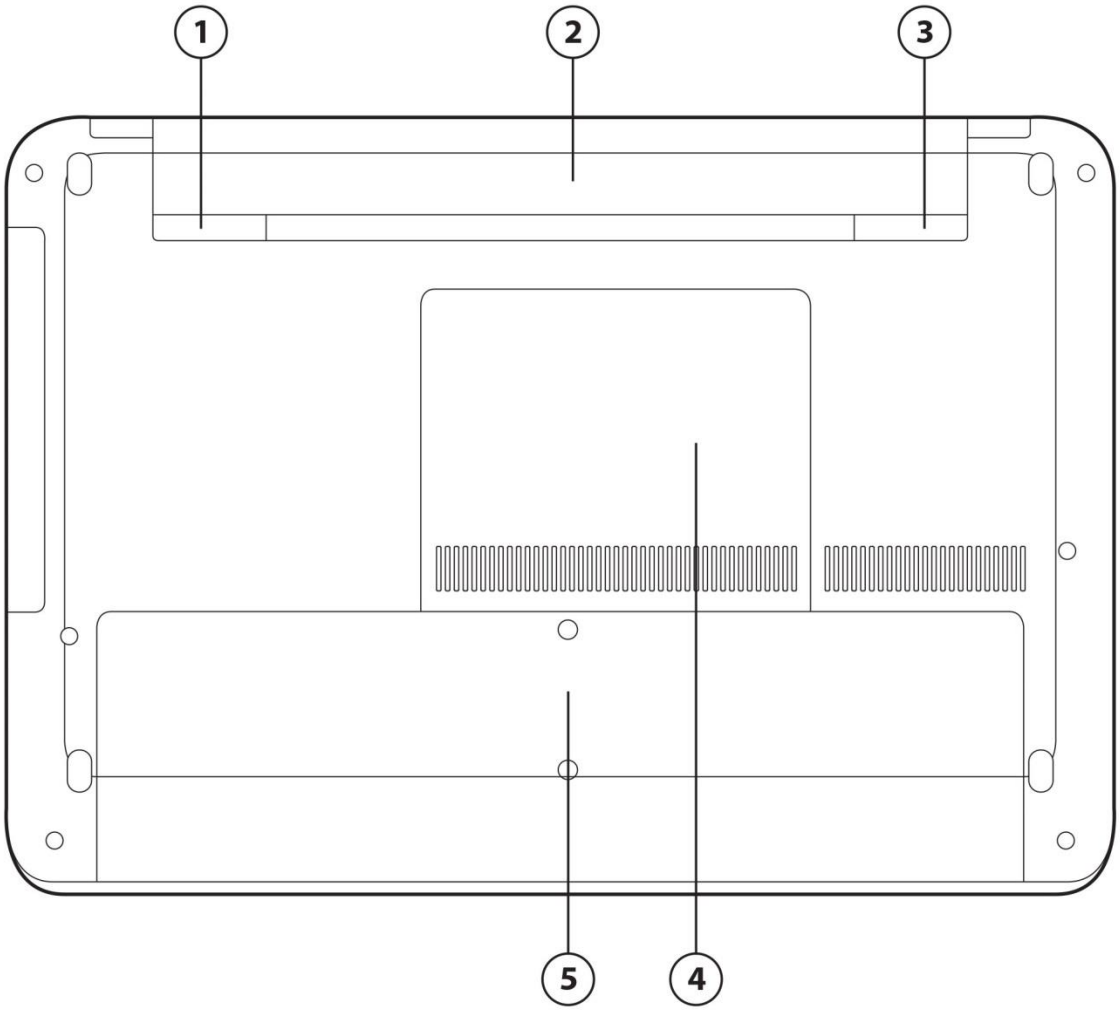
Overview



Right

1. Headphone/Microphone Combo Jack
2. USB 2.0 ports (2)
3. Optical drive eject button (select models only)
4. Security lock slot

Overview



Bottom

1. Battery lock
2. Battery bay
3. Battery release latch
4. Service door
5. Service door

Overview

AT A GLANCE

- Windows 8.1 versions, Windows 7 Pro 64 (available through downgrade rights from Windows 8.1 Pro 64), Windows 7 versions, FreeDOS 2.0
- Durable multi-layer soft touch painted LCD cover and brushed aluminum keyboard deck that keeps system looking good longer
- Full-sized spill-resistant keyboard with a thin layer of Mylar film to prevent minor spills; full separate numeric keypad
- Larger Touchpad with gestures support, on/off button with LED indicator
- Enhanced security features including HP Client Security Manager and optional HP Fingerprint Reader and TPM 1.2
- HP 3D DriveGuard helps protect critical information while you're on the move.
- Optional backlit keyboard (available in Summer 2014)
- Optional 4-cell (40WHr) long life battery
- Optional HD webcam with dual-microphone array for video conferencing
- HDMI port for connecting to high-resolution displays; USB 3.0 ports
- DTS Sound+ optimized for high fidelity audio
- Widescreen LED-backlit HD display with 16:9 aspect ratio with available 15.6-inch diagonal HD
- Accelerated Processing Unit and graphics from AMD
- Models with switchable discrete graphics.
- AMD Radeon™ Dual Graphics to automatically manage how the graphics processor in the AMD APU and the AMD Radeon™ discrete graphics processor are used. (AMD A8, A10, FX APU skus only)
- Wireless on/off and speaker mute button to conveniently manage the connectivity and speaker.
- Flexible wireless connectivity options controlled by HP Connection Manager:
    - Integrated 802.11 b/g/n wireless LAN module
    - Integrated 802.11 b/g/n (1x1) with Bluetooth® 4.0 High Speed combo card
    - Integrated 802.11 a/b/g/n (2x2) with Bluetooth 4.0 High Speed combo card

NOTE: See important legal disclosures for all listed specs in their respective features sections.

Features

PRODUCT NAME

HP ProBook 455 G2 Notebook PC

OPERATING SYSTEM

Preinstalled

Windows 8.1 Pro 64*
Windows 7 Pro 64 (available through downgrade rights from Windows 8.1 Pro 64)**
Windows 8.1 64*
Windows 7 Professional 64***
Windows 7 Home Premium 64***
Windows 7 Home Basic 64***
FreeDOS 2.0

* Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See http://www.microsoft.com for details.
** This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.
*** Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

ACCELERATED PROCESSING UNIT

AMD FX-7500 APU with Radeon™ R7 Graphics, Quad Cores, 3.3GHz/2.1GHz, 2MB L2 Cache
AMD A10-7300 APU with Radeon™ R6 Graphics, Quad Cores, 3.2GHz/1.9GHz, 2MB L2 Cache
AMD A8-7100 APU with Radeon™ R5 Graphics, Quad Cores, 3.0GHz/1.8GHz, 2MB L2 Cache
AMD A6 Pro-7050B APU with Radeon™ R4 Graphics, Dual Cores, 3.0GHz/2.2GHz, 1MB L2 Cache

NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

CHIPSET

AMD A76M FCH

GRAPHICS

Integrated graphics:
AMD A10-7300 APU with Radeon™ R6 Graphics
AMD A8-7100 APU with Radeon™ R5 Graphics
AMD A6 Pro-7050B APU with Radeon™ R4 Graphics

Switchable Discrete Graphics
A6 series APU - AMD Radeon™ R5 M255, with 2 GB dedicated DDR3 video memory

FX series APU - AMD Radeon™ R7 M265DX Dual graphics*, with 2 GB dedicated DDR3 video memory
A10 series APU - AMD Radeon™ R7 M260DX Dual graphics*, with 2 GB dedicated DDR3 video memory
A8 series APU - AMD Radeon™ R6 M255DX Dual graphics*, with 2 GB dedicated DDR3 video memory

NOTE: AMD Radeon™ Dual Graphics requires an AMD "A" series APU plus an AMD Radeon™ discrete graphics configuration.

Features

AMD Dynamic Switchable Graphics technology requires either an AMD "A" series APU or an Intel processor, plus an AMD Radeon™ discrete graphics configuration and is available on Windows 8.1 Pro, Windows 8.1, Windows 8 Pro, Windows 8, Windows® 7 Professional, Home Premium, and/or Home Basic OS.
NOTE: With AMD Dynamic Switchable Graphics technology, full enablement of all discrete graphics video and display features may not be supported on all systems (e.g. OpenGL applications will run on the integrated GPU or the APU as the case may be).
NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.
***** Minimum DDR3-1600 required. Dual graphics may be enabled by single channel memory configurations but is not recommended as some memory sensitive applications might have lower dual graphics performance.

DISPLAY

Internal
15.6" diagonal LED-backlit HD anti-glare (1366 x 768)
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 1920 x 1200 external resolution @60 Hz
HDMI
Supports direct connection to high-definition displays with up to 1920 x 1200@120Hz resolution and 7-channel audio with one convenient cable (not included)

NOTE: HD content required to view HD images.
NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

STORAGE AND DRIVES

Primary Storage Bay
Hard Drives
320/500/750 GB/1/1.5 TB 5400 rpm SMART SATA HDD;
500 GB 7200 rpm SMART SATA HDD

Solid State Drive
128 GB SSD SATA

HP 3D DriveGuard (Windows only)
The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive

NOTE: For hard drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1) of system disk is reserved for the system recovery software.

OPTICAL DRIVES

Fixed 9.5 mm SATA optical drive
DVD+/-RW SuperMulti DL Drive*
DVD-ROM Drive*
No optical drive option

* Sold separately as an optional feature.

MEMORY

Features

Standard
DDR3L SDRAM (1600 MHz)
Two SODIMM slots supporting dual-channel memory
2 GB, 4 GB, and 8 GB SODIMMs
Maximum
Upgradeable to 16384 MB with optional 8192 MB SODIMMs in slots 1 and 2
Dual-channel
Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. With Windows Starter 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

NETWORKING/COMMUNICATIONS

Wireless
Support for a broad range of secure, integrated wireless LAN featuring support for the latest industry standards. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN options.

Wireless LAN (WLAN)*
Realtek 802.11 b/g/n (1x1)
Realtek 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo
Broadcom 802.11 a/b/g/n (2x2) with Bluetooth® v4.0 combo

Communications
Realtek 10/100/1000** Ethernet Controller

* Sold separately as an optional feature.
** The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

AUDIO/MULTIMEDIA

Audio
DTS Sound+
Integrated stereo speakers
Integrated digital microphone (dual-microphone array when equipped with optional webcam)
Function keys for microphone mute, volume up, volume down
Stereo Audio-out (headphone)/Audio-in(microphone)

Webcam
Optional* 720p HD** webcam

- HD format (widescreen)
- Supports videoconferencing and still image capture
- High quality fixed focus lens
- Video capture at various resolutions up to 1280x720 resolution (720p) and up to 30fps
- M-JPEG compression supports higher frame rates for video capture and videoconferencing
- Improved low light sensitivity
- Improved dynamic range

Features

- Skype-ready***, ****

* Available on select models.
** HD content required to view HD images.
*** Internet access required.
**** Not available in China

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard. The 101/102-key compatible keyboard features a full-pitch key layout with desktop keyboard features, such as editing keys, both left and right control and alt keys, and function keys. US and International key layouts are available. Includes a separate numeric keypad. Backlit keyboard available as an option.
Pointing Devices
Touchpad with gestures support, on/off button with LED indicator, two-way scroll, two pick buttons
Buttons and Function Keys
Separate launch buttons provide easy access to wireless on/off and speaker mute. Function keys provide control of features including: standby mode, display brightness, external display, microphone mute, volume down, volume up and keyboard backlight on/off (select models only).

SOFTWARE AND SECURITY

Software Included

	Windows 8.1	Windows 7
Security	Absolute Persistence Module[1]	Absolute Persistence Module
	Device Access Manager with Just In Time Authentication	Device Access Manager with Just In Time Authentication
	HP File Sanitizer[2]	HP File Sanitizer[2]
	HP Client Security Manager[3]	HP Client Security Manager[3]
	HP SpareKey	HP SpareKey
	Microsoft Defender	Microsoft Security Essentials[4]
	DigitalPersona Fingerprint Driver	DigitalPersona Fingerprint Driver
	Validity Fingerprint Driver	Validity Fingerprint Driver
	Hardware Root of Trust	Hardware Root of Trust
	HP Automatic DriveLock	HP Automatic DriveLock
	HP BIOS Protection	HP BIOS Protection
	HP Disk Sanitizer[5]	HP Disk Sanitizer[5]
	DASH Support	DASH Support
	HP DriveLock	HP DriveLock
	HP SpareKey[6]	HP SpareKey[6]
	Hybrid Boot	Hybrid Boot
	Master Record Security	Master Record Security
	Measured Boot	Measured Boot
	Power On Authentication	Power On Authentication
	Pre-Boot Security	Pre-Boot Security
	Secure Boot (Windows 8.1)	Secure Boot (Windows 7)
	Secure Erase[7]	Secure Erase[7]
MultiMedia	Cyberlink Power2Go	Cyberlink Power2Go
	Cyberlink PowerDVD	Cyberlink PowerDVD
Communications	HP Connection Manager	HP Connection Manager

Features

	HP Wireless Hotspot[8]	
	Microsoft	
HP Value Add Software	Digital Energy Star Logo W8	Digital Energy Star Logo W8
	Getting Started with Windows 8	Getting Started with Windows 8
	HP 3D DriveGuard	HP 3D DriveGuard
	HP Ceement	HP Ceement
	HP ePrint[9]	HP ePrint[9]
	HP Hotkey	HP Hotkey
	HP PageLift App (Requires Windows 8)	HP PageLift for Win 7
	HP Recovery Manager	HP Recovery Manager
	HP Registration App	HP Registration App
	HP Setup	HP Setup
	HP Softpaq Download Manager	HP Softpaq Download Manager
	HP Software Setup	HP Software Setup
	HP Support Assistant[10]	HP Support Assistant[10]
	HP Recovery Disc Creator (HPRDC)	HP Recovery Disc Creator (HPRDC)
	HP WallPaper	HP WallPaper
	System Default Settings for Win8	System Default Settings for Win8
	UEFI System Diagnostics W8	UEFI System Diagnostics W8
3rd Party	Box 50GB Offer Desktop Icon[11]	Box 50GB Offer Desktop Icon[11]
	Box App	Box App
	Foxit PhantomPDF Express	Foxit PhantomPDF Express
	Buy Office	Buy Office

[1]The Absolute Persistence agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
[2]For the use cases outlined in the DOD 5220.22-M Supplement. Supports standard Hard Drives. Initial setup required.
[3]Not all features are remotely manageable.
[4]Opt in and internet connection required for updates.
[5]For the use cases outlined in the DOD 5220.22-M Supplement. Does not support Solid State Drives (SSDs). Initial setup required. Web history deleted only in Internet Explorer and Firefox browsers and must be user enabled.
[6]Requires initial user set up.
[7]For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
[8] The wireless hotspot application requires an active internet connection and separately purchased data plan. While HP wireless hotspot is active, on-device applications will continue to work and will use the same data plan as the wireless hotspot. Wireless hotspot data usage may incur additional charges. Check with your service provider for plan details. Requires Windows.
[9]Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter).Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.
[10] Internet access required.
[11] Offer available on new 2014 HP commercial PC and requires Box registration. Offer subject to change without notice.

Security

Standard
HP Client Security Manager (Windows only)

Features

Microsoft Security Essentials(Windows 7)/Microsoft Defender (Windows 8)*
HP Drive Encryption**
HP BIOS Protection***
Security lock slot
TPM 1.2 Embedded Security Chip

Optional
HP Fingerprint reader

NOTE: The Absolute Persistence agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.
* Opt in and internet connection required for updates.
** HP Drive Encryption requires Windows. Data is protected prior to Drive Encryption login. Turning the PC off or into hibernate logs out of Drive Encryption and prevents data access.
*** HP Tools partition with an HP BIOS required for automatic recovery.

For more information on HP security solutions refer to: http://www.hp.com/go/security.

POWER

Power Supply
Models with discrete graphics:
External 65W HP Smart AC Adapter
Models with integrated graphics:
External 45W HP Smart AC Adapter

45W Smart AC Adapter (two prong) (Japan only) (1.0 m power cord only)

Power cord included is 1.8 m (+/- 0.1 m) or 1.0 m (+/- 0.1 m).

Total length including external AC adapter is 12 feet (3.66 meter).

Primary Battery
HP 4-cell (44 WHr) Lithium-Ion Battery
HP 4-cell (40 WHr) Long Life Lithium-Ion Battery

Battery Life

	Hardware Details	Configurations with integrated graphics	Configurations with discrete graphics
HP ProBook 455			
4-cell (44 WHr) battery	HDD	7 hours 15 minutes	7 hours 15 minutes
4-cell (40Whr) LLB battery	HDD	6 hours 30 minutes	6 hours 30 minutes

System Standby Time*
Up to 7 days (4-cell battery) or up to 7 days(4-cell long life battery)

* Standby life will vary depending on various factors including battery, Memory, CPU, EC and LAN chip. The maximum capacity of the battery will naturally decrease with time and usage.

Features

Power Conservation
AMD PowerPlay technology (discrete models)
Hibernation
Standby
ACPI compliance

WEIGHTS & DIMENSIONS

Weight
Lightest possible configuration across battery and panel options (HD Panel, No-ODD, 4-cell (44Whr) Battery, HDD) at 4.74lb / 2.15kg
Lightest Weight Configurations (across panel, battery and ODD options, if applicable)

	4-cell (44Whr)
No-ODD	4.74lb/2.15kg
ODD	4.98lb/2.26kg

Dimensions (w x d x h)
14.76 x 10.35 x 0.92 (front) -1 in (at rear)
37.50 x 26.28 x 2.34 (front) -2.55 cm (at rear)

PORTS/SLOTS

Ports
USB 3.0 – Two
USB 2.0 – Two
HDMI 1.4a – One
VGA – One
Headphone/Microphone Combo Jack – One
Power connector – One
RJ-45 – One

Digital Media Slots
Multi Media Reader Slot supporting SD, SDHC, SDXC

SERVICE AND SUPPORT

HP Services offers limited 3-year, 1-year and 90-day warranty options depending on country;
1-year limited warranty on primary battery. On-site service is also available. Optional HP Care Pack Services are extended service contracts that go beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: www.hp.com/go/cpc.

NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.
http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp

Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	19.5V
	Average Operating Power	21W
	Max Operating Power	Discrete < 65W UMA < 45W
Temperature	**Operating**	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
	Non-operating	-4° to 140° F (-20° to 60° C)
Relative Humidity	**Operating**	10% to 90%, non-condensing
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
Shock	**Operating**	40 G, 2 ms, half-sine
	Non-operating	200 G, 2 ms, half-sine
Random Vibration	**Operating**	0.75 grms
	Non-operating	1.50 grms
Altitude (unpressurized)	**Operating**	-50 to 10,000 ft (-15.24 to 3,048 m)
	Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)
Planned Industry Standard Certifications	**UL**	Yes
	CSA	Yes
	FCC Compliance	Yes
	ENERGY STAR®	Select models*
	EPEAT®	Registered Gold in United States**
	ICES	Yes
	Australia / NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	KC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	BNCI or BELUS	Yes
	CIT	Yes
	GOST	Yes
	Saudi Arabian Compliance (ICCP)	Yes
	SABS	Yes
	UKRSERTCOMPUTER	Yes

* Configurations of the HP ProBook 455 G2 that are ENERGY STAR qualified are identified as HP ProBook 455 G2 ENERGY STAR on HP websites and on www.energystar.gov.
** EPEAT registration varies by country. See www.epeat.net for registration status by country.
EPEAT status listed above applies to U.S.

For accessibility information on HP products, please visit: http://www.hp.com/accessibility.

DISPLAYS

15.6-inch LED HD (1366 x 768) anti-glare	**Dimensions** (W x H)	14.17 x 8.83 in (36.0 x 22.43 cm)
	Diagonal Size	15.6 in (39.6cm)
	Surface Treatment	Anti-glare

	Contrast Ratio	400:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	**Pitch**	0.252 mm
		Format	1366 x 768
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	106 ppi	
	Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

STORAGE AND DRIVES

Internal Storage			
500 GB* 7200 rpm SATA Hard Drive	**Drive Weight**	0.25 lbs (115g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
320 GB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.22 lb (101 g)	
	Capacity	320 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

500 GB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.22 lb (101 g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
750 GB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.22 lb (101 g)	
	Capacity	750 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	1,465,149,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
1 TB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.254 lb (115 g)	
	Capacity	1 TB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
1.5 TB* 5400 rpm SATA Hard Drive	**Drive Weight**	TBD	
	Capacity	1.5 TB	
	Height	TBD in (TBD mm)	

Technical Specifications

	Width	TBD in (TBD mm)	
	Interface	TBD	
	Transfer Rate	**Synchronous** (maximum)	TBD MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	TBD ms
		Average	TBD ms
		Maximum	TBD ms
	Rotational Speed	5400 rpm	
	Logical Blocks	TBD	
	Operating Temperature	TBD ° F (TBD ° C) [case temp]	
	Features	TBD	

SATA 128 GB*, 2.5-inch Solid State Drive	**Drive Weight**	73 Grams	
	Capacity	128 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70 mm)	
	Interface	SATA 3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		415 MB/s	175 MB/s
	Logical Blocks	250,069,680	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-8; SATA 3.0; DIPM; TRIM	

* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB (for Windows 8) of system disk is reserved for system recovery software.

Optical Drives			
DVD+/-RW SuperMulti DL Drive*	**Access Times**	Random	<140ms CD (typical)
			< 160 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	
		8X DVD	
		24X CD-R	
		24X CD-RW	
		8X DVD+R	
		8X DVD+RW	
		8X DVD-R	
		6X DVD-RW	
		6X - DVD+R Dual Layer	
		6X - DVD-R Dual Layer	
		5X DVD-RAM	
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	

Technical Specifications

	Supported Media (read)	CD-DA, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, DVD+R DL, DVD-R DL	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	8.5 GB	
	Transport	Tray Loading	
DVD-ROM Drive	**Access Times**	Random	< 140 ms CD (typical) < 160 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM 8X-DVD	
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	None	
	Max Media Capacity (read)	8.5GB	
	Transport	Tray Loading	

SECURITY

HP Fingerprint Reader (optional)	**Mobile Voltage Operation**	3.0V-3.6V Single Supply
	Operating Temperature	32° – 158°F (0° – 70°C)
	Current Consumption @ 3.3V	Less than 70 mA peak imaging and scrolling Less than 25 mA hardware finger detection Advanced Power Management
	High-Rate Image Capture	Up to 240 image frames /sec
	ESD Resistance	IEC 61000-4-2 Level 4 (±15KV)
	Detection Matrix	192 x 16 Pixels 9.7 mm x 0.81 mm 500 ppi High-Resolution Images

NETWORKING/COMMUNICATIONS

Integrated Realtek 10/100/1000 NIC	**Ethernet Features**	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40)

		Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet) Jumbo Frame 9K Auto MDI/MDIX Crossover cable detection
	Power Management	ACPI compliant - multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	Interface	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ
	NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller
Realtek 802.11 b/g/n (1x1)*	**Wireless LAN Standards**	IEEE 802.11b IEEE 802.11g IEEE 802.11n
	Interoperability	Wi-Fi certified
	Frequency Band	2.402 – 2.482 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: card will support rates for NSS=1 for RX and TX for 20 MHz channels. Short and long guard interval will be supported.
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM
	Security[1]	IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only AES-CCMP: 128 bit in hardware 802.1x authentication types WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification IEEE 802.11i Cisco Certified Extensions, all versions through V5 WAPI
	Network Architecture	Ad-hoc (Peer to Peer)
	Models	Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power[2]	13.5 dBm, nominal

Technical Specifications

Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Associated to Access Point, Idle: 250 mW nominal Wireless Button Off: 100 mW nominal Radio disabled: 75 mW nominal	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-70dBm (72.2 Mbps)	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure	
Form Factor	PCI-Express Half-MiniCard	
Weight	0.013 lb (6 g)	
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating	14° to 158° F (–10° to 70° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	Amber – Radio OFF; White – Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

*Wireless access point and internet service required. Availability of public wireless access points limited.

Realtek 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo *	**Wireless LAN Standards**	IEEE 802.11b IEEE 802.11g IEEE 802.11n
	Interoperability	Wi-Fi certified
	Frequency Band	2.402 – 2.482 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: card will support rates for NSS=1 for RX and TX for 20 MHz channels. Short and long guard interval will be supported.
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM

Technical Specifications

Security[1]	IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only AES-CCMP: 128 bit in hardware 802.1x authentication types WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification IEEE 802.11i Cisco Certified Extensions, all versions through V5 WAPI	
Network Architecture	Ad-hoc (Peer to Peer)	
Models	Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power[2]	13.5 dBm, nominal	
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Associated to Access Point, Idle: 250 mW nominal Wireless Button Off: 100 mW nominal Radio disabled: 75 mW nominal	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-70dBm (72.2 Mbps)	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure	
Form Factor	PCI-Express Half-MiniCard	
Weight	0.013 lb (6 g)	
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating	14° to 158° F (–10° to 70° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	Amber – Radio OFF; White – Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Bluetooth 4.0 Wireless Technology	
Bluetooth Specification	2.1+EDR, 3.0, 4.0 Compliant
Dimensions	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm)

Technical Specifications

Frequency Band	2402 to 2480 MHz	
Number of Available Channels	79 (1 MHz) available channels	
Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric	
Transmit Power	Max 4 dBm (Bluetooth Class II)	
Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate	
Power Consumption	Average 230mW Sleep <1 mW	
Antenna	Internally integrated within module	
Range	Up 33 ft (10 m)	
Electrical Interface	USB 2.0 compliant Microsoft Windows Plug and Play compliant	
Bluetooth Software Supported	Broadcom Bluetooth for Windows Microsoft Windows Bluetooth Software	
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves	
Security	Full support of Bluetooth Security Provisions	
Power Management	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff	
Certifications	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark	
Temperature	Operating	–4° to 158° F (–20° to 70° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
Humidity	Operating	10% to 90%
	Non-operating	5% to 95%
Altitude	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
Bluetooth Profiles Supported	Serial Port Profile (SPP)[1] Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN)[1,2] Generic Object Exchange Profile (GOEP)[1,2] Object Push Profile (OPP)[1,2] File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2,] Human Interface Device Profile (HID)[1,2,3]	

FAX Profile (FAX)
Basic Imaging Profile (BIP)[2]
Headset Profile (HSP)
Hands Free Profile (HFP)
Advanced Audio Distribution Profile (A2DP)

[1] indicates the profile is supported by Microsoft Windows XP SP2
[2] indicates the profile is part of Windows Vista

*Wireless access point and internet service required. Availability of public wireless access points limited.

Broadcom 802.11 a/b/g/n (2x2) with Bluetooth® v4.0 combo*	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n • 2.402 - 2.482 GHz 802.11a/n • 4.9 - 4.95 GHz (Japan) • 5.15 - 5.25 GHz • 5.25 - 5.35 GHz • 5.47 - 5.725 GHz • 5.825 - 5.850 GHz • 2.402 - 2.482 GHz
	Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM
	Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through V5 • WAPI
	Network Architecture	Ad-hoc (Peer to Peer)
	Models	Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points

Technical Specifications

Output Power[2]	• 2.4G: +13.5dBm minimum • 5G: +12dBm minimum • Maximum output power must be able to achieve modular regulatory certification with notebooks that have antennas >20cm from the user and peak gain of +3dBi at 2.4GHz and +4dBi at 5GHz	
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio disabled: 75 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11a/g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-69 dBm (72.2 Mbps), -66 dBm (300 Mbps)	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications	
Form Factor	PCI-Express Half-MiniCard	
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)	
Weight	3.1g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (-10° to 70° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Bluetooth Specification

V4.0 High Speed, V2.1+EDR, backwards compatible with V1.1, 1.2 and 2.0

Number of Available Channels	79 (1 MHz) available channels
Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels

	Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)
Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Sleep <17 mW
Antenna	Internally integrated within module
Range	Up to 33 ft (10 m)
Electrical Interface	USB 2.0 compliant Microsoft Windows Plug and Play compliant
Bluetooth Software Supported	Broadcom Bluetooth for Windows Microsoft Windows Bluetooth Software
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves
Security	Full support of Bluetooth Security Provisions
Power Management	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Certifications	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	Generic Access Profile (GAP) Service Discovery Application Profile (SDAP) Serial Port Profile (SPP) Dial_Up Networking Profile (DUN) Generic Object Exchange Profile (GOEP) Object Push Profile (OPP) File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP) Personal Area Networking Profile (PAN) Human Interface Device Profile (HID) Generic Audio/Video Distribution Profile (GAVDP) Advanced Audio/Video Distribution Profile (A2DP) FAX Profile (FAX) Basic Imaging Profile (BIP) Headset Profile (HSP) Hands Free Profile (HFP) Basic Printing Profile (BPP) VDP (Video Distribution Profile) AVRCP (Audio Video Remote Control Profile)

*Wireless access point and internet service required. Availability of public wireless access points limited.

AUDIO/MULTIMEDIA - DTS SOUND+

Hardware	**Implementation**	Realtek ALC3227-CG High Definition CODEC

Technical Specifications

	Function Key Volume Controls	Volume up, volume down, and speaker mute
	Full Duplex	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes, dual digital microphone array when equipped with optional webcam
Audio Output Quality	**Frequency Response**	20 Hz – 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	–110 dB
	Play/Record Sampling Rate(s)	8 kHz – 48kHz
	DAC	16, 20 or 24-bit
	ADC	16 or 20-bit
Integrated Stereo Speakers	**Power Rating**	2 Watts
	Impedance	4 Ohms

POWER

HP 65W Smart AC (discrete configurations)	**Dimensions**	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.62 lb (280 g)	
	Input	100 to 240 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC
	Output	Output power	65W
		DC output	18.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	32° to 104° F (0° to 40° C)
		Non-operating (storage) temperature	-4° to 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals	

		- C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF - over 200,000 hours at 25°C ambient condition.	
HP 45W Smart AC Adapter (Configurations with integrated graphics)	**Dimensions**	3.78 x 1.95 x 0.88 in (9.6 x 4.95 x 2.24 cm)	
	Input	90 to 265 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.4 A at 90 VAC and maximum load
	Output	**Output power**	45W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<8A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 121° F (-20° to 85° C)
		Altitude	0 to 16,405 ft (0 to 5,000 m)
		Humidity	0% to 95%
		Storage Humidity	0% to 95%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; Reliability - failure rate of less than 0.1% annually within the first three years of operation.	
4-Cell (44 WHr) Lithium-Ion battery	**Dimensions** (H x W x L)	TBD in (TBD cm)	
	Weight	TBD lb (TBD kg)	
	Cells/Type	4-cell Lithium-Ion	
	Energy	Watt-hour Capacity	44 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	TBD hours
		System ON	TBD 6 hours (depending on system power consumption)
4-Cell (40 WHr) Long Life Lithium-Ion battery	**Dimensions** (H x W x L)	TBD in (TBD cm)	
	Weight (max)	TBD lb, (TBD kg)	
	Cells/Type	4-cell Lithium-Ion	
	Energy	Voltage	TBDV

	Amp-hour capacity	TBD Ah
	Watt-hour capacity	40Wh
Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
	Operating (Discharging)	14° to 122° F(-10° to 50° C)
	Non-operating	-4° to 122° F (-20° to 50° C)
Battery Re-Charge Time	System in OFF or Standby Mode	TBD hours
	System ON	TBD hours
Fuel Gauge LED	No	
Warranty	1 year	
Optional Travel Battery Available	No	

ENVIRONMENTAL

Eco-Label & Certifications declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration
- US ENERGY STAR®
- EPEAT <Gold> registered in the United States. See http://www.epeat.net for registration status in your country.

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook".

Energy Consumption (in accordance with US ENERGY STAR® test method)

	115VAC, 60Hz	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	12.19 W	12.65 W	11.96 W
Normal Operation (Long idle)	10.34 W	10.16 W	10.19 W
Sleep	0.80 W	0.83 W	0.79 W
Off	0.29 W	0.32 W	0.29 W

Note:

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Technical Specifications

Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	42 BTU/hr	43 BTU/hr	41 BTU/hr
Normal Operation (Long idle)	35 BTU/hr	35 BTU/hr	35 BTU/hr
Sleep	3 BTU/hr	2 BTU/hr	2 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr

*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	3.1	22
Fixed Disk – Random writes	3.1	22

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- 3 USB ports
- 1 PC card slot (type I/II)
- 1 ExpressCard/54 slot
- 1 IEEE 1394 Port
- 2 SODIMM memory slots
- Optional expansion base docking station
- 1 multi-bay II storage port
- Interchangeable HDD

Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.

Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:
Mercury greater the1ppm by weight
Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)
Battery type: Lithium
Battery size: 6-cell high capacity Lithium-Ion battery (optional 8 cell available)
Battery type:

Technical Specifications

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the <Gold> level, see www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 0% post-consumer recycled plastic (by wt.)
- This product is 96.2% recycle-able when properly disposed of at end of life.
- Low halogen is supported

Packaging Materials

External:	PAPER/Corrugated	398 g
Internal:	PLASTIC/Polyethylene low density	18.1 g
	PLASTIC/EPE-Expanded Polyethylene	36 g

The plastic packaging material contains at least 75% recycled content.
The corrugated paper packaging materials contains at least 75% recycled content.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Technical Specifications

Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Eco-label certifications
http://www8.hp.com/us/en/hp-information/environment/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf
and
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

COUNTRY OF ORIGIN

China

Options and Accessories (sold separately and availability may vary by country)

Type	Description	Part #
Cases	HP Essential Top Load Case	H2W17AA#xxx
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Essential Messenger Case (up to 17.3")	H1D25AA
Docking	HP 3005pr USB 3.0 Port Replicator	H1L08AA#xxx
Input/Output – Mice	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Optical Travel mouse	RH304AA
Adapters	HP 45W Smart AC Adapter 4.5mm	H6Y88AA#XXX
	HP 65W Slim Adapter	AX727AA#XXX
Security	HP UltraSlim Keyed Cable Lock	H4D73AA
Monitors	HP ProDisplay P201 20-inch LED Backlit Monitor	C9F26AA
	HP ProDisplay P201m 20-inch LED Backlit Monitor (With Integrated Speakers)	C9F73AA
	HP ProDisplay P221 21.5-inch LED Backlit Monitor	C9E49AA
	HP ProDisplay P231 23-inch LED Backlit Monitor	E4S07AA

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Options and Accessories (sold separately and availability may vary by country)

Summary of Changes

Date of change:	Version History:		Description of change:
June 5, 2014	From vApril'14 to v'June	Changed	Environmental specs, change log
June 20, 2014	From v2 to v3	Changed	Changes throughout the document